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Growth Through Agricultural Progress

*Lecture Series
In Honor of the*

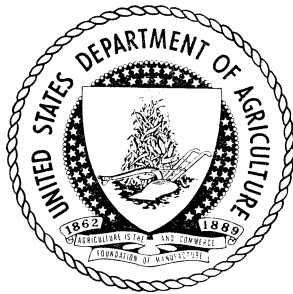
United States Department of Agriculture CENTENNIAL YEAR

GRADUATE SCHOOL

U. S. DEPARTMENT OF AGRICULTURE

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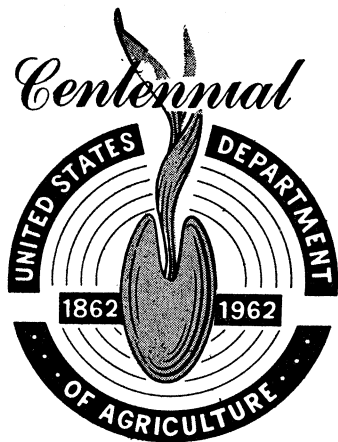
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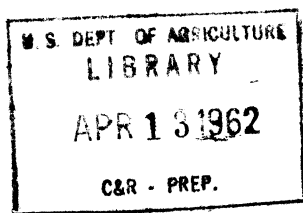
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Growth Through Agricultural Progress



*Lecture Series
In Honor of the*

United States Department of Agriculture CENTENNIAL YEAR

Edited by Wayne D. Rasmussen

GRADUATE SCHOOL U. S. DEPARTMENT OF AGRICULTURE

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**UNITED STATES DEPARTMENT OF AGRICULTURE
GRADUATE SCHOOL**

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PREFACE

This book, "Growth Through Agricultural Progress," brings together lectures given by five agricultural leaders and historians as the Centennial Lecture Series. The lectures were given in the Jefferson auditorium of the U. S. Department of Agriculture in the autumn of 1961. The series looked forward to the Centennial of the U. S. Department of Agriculture and the Land-Grant Colleges, to be celebrated in 1962.

The series was arranged by the USDA Graduate School, a self-supporting institution that since 1921 has carried on an educational program for Federal employees.

Along with free public lectures the School offers each year more than 300 evening courses, a correspondence program, and special institutes and seminars to supplement in-service training. Most of our teachers hold full-time government jobs as do the members of the committees that plan our curriculum and other activities.

Plans for the Centennial lecture series, "Growth Through Agricultural Progress," were drawn up by a committee under the chairmanship of Frank J. Welch, Assistant Secretary of Agriculture. Assisting him were Phillip F. Aylesworth, Wayne D. Rasmussen, R. Lyle Webster, and E. T. York, Jr., of the Department of Agriculture, C. N. Shepardson, Federal Reserve Board, Russell Thackrey, American Association of Land-Grant Colleges and State Universities, and Walter W. Wilcox, Library of Congress. I served *ex officio*.

We are indebted to many people who helped us present the lecture series and prepare this book. Gladys L. Baker assisted both in developing the series and preparing the book. The book was edited by Wayne D. Rasmussen. He was assisted by Vivian L. Bedon, Helen H. Edwards, Connie S. Gluck, Earl M. Rogers, Mae Smith, and Vivian Wiser of the Agricultural History Branch, Economic Research Service. Vera Jensen of the staff of the Graduate School handled many of the technical details. The cover was designed by the Art and Graphics Division, Office of Information.

JOHN B. HOLDEN
Director of the
USDA Graduate School

INTRODUCTION

Even though the Centennial Year is not until 1962, the Board of Directors of the Graduate School thought that a carefully planned series of papers pertaining to American Agriculture, USDA, and the Land-Grant Colleges, prepared and presented by some of the Nation's distinguished leaders, would provide excellent informational material and stimulus for the Centennial celebration that will take place next year.

As a matter of fact, we are not only involved today in the observation of one anniversary but two—the pre-centennial of the establishment of the United States Department of Agriculture and the fortieth year of service of the Graduate School.

The Graduate School lecture series needs no introduction. Since 1931, when the first series was offered, the Graduate School has presented one or two series of lectures each year on subjects ranging from public administration to the international age of agriculture and the promise of the life sciences.

They have provided a stimulating means of learning—of gaining new facts and new insights in a wide range of subjects, of revising our information in the light of new findings, and of considering the prospects of what lies ahead for agriculture.

Those who have planned these lectures through the years have brought a procession of illustrious speakers to Jefferson auditorium, speakers who in sharing their knowledge and insights, have started a chain reaction of new ideas. These ideas, in turn, have brought new vitality and new approaches to the Department of Agriculture.

The series we are presenting in this book promises to be fully as stimulating as those in previous years. The first on "The Profile of the USDA—The First Fifty Years," is by Vernon Carstensen of the University of Wisconsin. He traces the beginnings of the Department, and indicates the importance of our early experience to our present development.

The second lecture, by one of America's most distinguished sons, Henry A. Wallace, entitled "The Department as I Have Known It," places the Department's growth and experiences during the past fifty years in perspective. Mr. Wallace's recollections should help us to attack today's problems with vigor and insight.

The mighty contributions of the Land-Grant Colleges, both to agriculture and to the life of our nation, are discussed by President James H. Hilton of Iowa State University in his paper entitled "The Land-Grant College: Past and Present." His discussion of problems facing the Land-Grant Colleges and the Department today is indicative of the need for greater attention to fundamental questions.

Agriculture has made many vital contributions to the American economy as Jesse W. Tapp of the Bank of America points out in the fourth lecture, entitled "Contributions of Agriculture to Our Economy." Mr. Tapp emphasizes, however, that some major problems remain to be resolved if agriculture is to continue to make its maximum contribution to the growth and welfare of our people.

The final lecture in this series, "Agriculture, Today and Tomorrow," is by Secretary of Agriculture Orville L. Freeman. The Secretary emphasizes the importance of an abundance of food and fiber and other agricultural products in terms of our national strength and well-being. His concluding thought, "Let it never be said that we had the scientific knowledge and technical skill to produce power sufficient to destroy civilization, but that we did not have the ability, the vision, and the will to use that knowledge to produce and distribute the abundance that science and technology now offer to a world at peace," is a stirring call to every listener and reader to aid in reaching that goal.

FRANK J. WELCH
*Assistant Secretary
of Agriculture*

PROFILE OF THE USDA—FIRST FIFTY YEARS

Vernon Carstensen

Almost 100 years ago to the month Abraham Lincoln, in his first annual message to Congress, recommended that something be done for agriculture. "Agriculture," he declared, "confessedly the largest interest of the nation has, not a department, nor a bureau, but a clerkship only, assigned it in the government. While it is fortunate that this great interest is so independent in its nature as to not have demanded and extorted more from the government, I respectfully ask Congress to consider whether something more cannot be given voluntarily with general advantage.

"Annual reports exhibiting the condition of our agriculture, commerce, and manufactures would present a fund of information of great practical value to the country. While I make no suggestions as to details, I venture the opinion that an agricultural and statistical bureau might profitably be organized."

There is nothing in this modest, almost tentative, proposal to suggest that during the next year Congress would pass three acts of monumental importance to American agriculture. The Department of Agriculture was created; the Homestead Act was finally adopted; and the Morrill Act was passed providing public lands for the establishment of colleges of agriculture. All were adopted during the second year of the Civil War and, except for the Homestead Act, received very little notice. That was true then. It seems to be almost as true today thanks to the ardent and aggressive 'celebration' of the centennial of the Civil War.

Vernon Carstensen, who became Associate Dean of the Graduate School of the University of Wisconsin in 1960, has gained wide recognition for his work in agricultural history. Formerly editor of Agricultural History, Dr. Carstensen has published a number of outstanding research studies in his field of work.

These acts did not spring full blown from the heads of the new Republican rulers in Washington. Behind each lay a long period of agitation running back, in one form or another, to the early days of the Republic. Many men of George Washington's generation assumed the perfectibility of man and society. Equally important or perhaps more so was the companion idea that man not only could improve himself but that he ought to do so. Although much of the eager innocence of a century and a half ago has been dissipated by bitter experience, one has only to consider the assumptions underlying many of our public acts—our technical aid programs, our enormous expenditures for education and research—to realize that we continue to live in that faith.

In the 1780's and the 1790's there were many people seeking ways to improve farming. Public spirited men in Pennsylvania, South Carolina, Massachusetts, and elsewhere founded agricultural societies intended to improve the methods and results of farming. The Massachusetts Agricultural Society offered to reward "men of enterprise who have, by their inquiries, made useful discoveries and communicated them to the public." All of the societies urged men to import and develop better animals and plants, to devise better methods of tillage, better tools and machinery.

George Washington, himself an agricultural experimenter, corresponded extensively with other farmers, among them the English reformers Arthur Young and Sir John Sinclair. Impressed by the usefulness of the English Board of Agriculture established in 1793, and persuaded that agriculture was a proper object of government patronage, in his last annual message to Congress in 1796, Washington urged the establishment of a board to collect, organize, and disseminate agricultural information, "to encourage and assist a spirit of discovery and improvement. This species of establishment contributes doubly to the increase of improvement by drawing to a common center the results, everywhere, of individual skill and observation and spreading them over the nation."

When Jefferson wrote the constitution for the Albemarle Agricultural Society he included a provision calling for reports on all the good and bad farming practices in the region in the expectation that "the choicest processes culled from every farm would compose a course probably near perfection." This idea recurs many times not only in the statements of purpose of the agricultural societies but also in the more humble farmers clubs that multiplied across the land after the 1830's. Similarly, the idea that the collection and publication of agricultural statistics might offer numerous benefits recurs again and again. Agricultural and other groups agitated to have the State governments collect such data, and, by 1850, 20 of the 31 States then comprising the United States were taking a periodic census, of which agricultural data formed a substantial portion.

Other persons saw education as the proper and most promising means of improving agriculture. Thus the Philadelphia Society for the Promotion of Agriculture proposed in 1794 that State funds be used to establish a State society that would promote the education of youth in agricultural pursuits. The legislature was unresponsive but the idea of institutions for agricultural education continued to have adherents. In 1821 a group of men provided for the establishment of the Gardiner Lyceum at Gardiner, Maine. Two years later the institution, dedicated to agricultural education, was opened and began its brief career. In the next years other institutions seeking the same end were opened in Massachusetts, Connecticut, Ohio, and other States. Most of these were private or quasi-public ventures but there was also substantial agitation for agricultural colleges to be supported by the States. Before 1860 Maryland, Pennsylvania, Michigan, and Iowa had all provided for such colleges.

Although the Federal Government was slow to respond to pressure for an agency within the executive branch to serve agriculture, officials and private citizens traveling abroad were encouraged to send home new seeds and plants that might be

useful. Moreover, in the 1820's, both the House and the Senate established permanent standing committees on agriculture.

The first systematic work by the Federal Government was done without legal authority. In the early 1830's Henry L. Ellsworth entered government service. In 1836 he was made Commissioner of the newly created Patent Office. There is fitting irony that this office, intended to serve those who sought a government-enforced monopoly, furnished the starting place for the Department of Agriculture, which was committed almost from its inception to the systematic improvement of all agriculture. It would assist no man's monopoly. In 1839 Ellsworth obtained a small appropriation to collect and distribute seeds and to collect and disseminate agricultural statistics.

During these same decades agricultural fairs, where men could exhibit the fruits of their husbandry, were conceived and multiplied—although some were described as involving little more than educational horse racing. Agricultural societies, farmers clubs, farm journals, and other enterprises aimed at agricultural improvement continued to increase. Meanwhile each decade brought exciting technological advance. After 1810 river steamboats appeared in the Ohio and the Mississippi; in 1825 the Erie Canal joined the Great Lakes to salt water at New York and gave the wheat growers of Michigan—and later Wisconsin—almost direct access to the markets of the world. Within another decade the railroad and the steam locomotive had come into being to provide what would become an all-weather transportation system, and McCormick and Hussey had demonstrated and patented their reapers. By the 1850's the railroad had reached Chicago, and men talked about using steam power for doing field work and some were actually trying it. Contemporary journals never tired of reminding their readers that they were living in an age of progress. De Tocqueville caught this spirit when he wrote in the 1830's: "I accost an American sailor, and I inquire why the ships of his country are built so as to last but for a short time; he an-

swers without hesitation that the art of navigation is every day making such rapid progress that the finest vessel would become almost useless if it lasted beyond a certain number of years. In these words, which fell accidentally and on a particular subject from a man of rude attainments, I recognize the general and systematic idea upon which a great people directs all its concerns."

But the part the government would play in assisting in improvements was still far from clear. From the beginning of the Republic many citizens argued that the central government was best that governed least, and many politicians and editors almost made a fetish out of resisting any enlargement of the responsibilities of the Federal Government. Cleveland in 1887 spoke to this sentiment when he emphasized the limited mission of the Federal Government and declared that though "the people should support the Government, the Government should not support the people." Yet there were innumerable things that the individual citizen could not do by himself. In the earlier and simpler days of the Republic the frontier had developed various cooperative devices to handle difficult or time-consuming tasks—cabin raising, log rolling, harvesting rings were all forms of voluntary cooperation. Similarly, the agricultural societies and farmers clubs were voluntary associations that sought to accomplish what the individual could not do alone.

All of these developments, these hopes and expectations, fears and anxieties, lay in the background when Lincoln suggested that Congress should do something for agriculture "voluntarily." Congress responded. A bill to create a department of agriculture was introduced and on February 17, 1862, the House Committee on Agriculture, of which Owen Lovejoy was chairman, reported it out and supported it with a brief statement. Charles B. Calvert, known as the father of the agricultural college of Maryland, was also a member of the agricultural committee and had been for many years active in the United States Agricultural Society, formed in 1852 partly to agitate for a department of agriculture.

The bill outlined the "designs and duties" of the proposed department. It was "to acquire and to diffuse among the people of the United States useful information on subjects connected with agriculture in the most general and comprehensive sense of the word." More specifically it was to procure, test, and distribute new and valuable seeds and plants, to conduct "practical and scientific experiments," collect agricultural statistics, and to publish annual and other reports.

But there was little general support in the early 19th century for the idea that the Federal Government should contribute directly to the general improvement. Indeed, many politicians made a point of professing to fear the central government. What had to be done, they said, could be done by the people themselves in associations. De Tocqueville had observed, "Americans of all ages, all conditions, and all dispositions, constantly form associations. . . . The Americans make associations to give entertainments, to found establishments for education, to build inns, to construct churches, to diffuse books, to send missionaries to the antipodes; and in this manner they found hospitals, prisons, and schools. . . . Whenever, at the head of some new undertaking, you see the government in France, or a man of rank in England, in the United States you will be sure to find an association."

That neither the pioneer nor the established citizen was above asking for aid from State or central government is attested by the numerous petitions asking for grants of all kinds sent to the State legislatures and the Congress. Lincoln in the 1850's recorded his conviction that good government must be expensive and formulated a rule which has delighted many since then. "The legitimate object of government is to do for the people what needs to be done, but which they cannot, by individual effort, do at all, or do so well, for themselves."

In the report which accompanied the bill, the committee, probably in the words of Charles B. Calvert, offered a quietly eloquent statement. "The cultivation of the earth was the first duty as-

signed to man, and it will of necessity be his latest work. When its culture shall have reached its highest point of perfection, under the guidance of science, art, and skill, man may hope to find the whole earth transformed into the beautiful garden that he left in olden times." Like Milton in *Paradise Lost*, the committee seemed to assume that knowledge was perfect and complete before man was ejected from the Garden and that it was man's duty to re-discover and reassemble this knowledge. The committee noted with some asperity that politicians were quick to praise farmers and farming but slow to adopt legislation designed to help them. Commerce and industry were well organized and prepared to protect their interests, but farmers needed a Federal department that would conduct investigations so that the processes of nature could be described and understood. This required extensive experimentation and observation. Such work, the committee declared, was already being carried on in England by rich men and by government in France and other European countries, but it was too expensive to be carried on in the United States by individuals or private associations. "The man who makes two blades of grass grow where one grew before, the committee declared, "is the benefactor of his race. If five additional bushels of wheat and ten of corn could be made to grow on each acre sown or planted, the additional profit, compared with the outlay, would be beyond computation. To do this it is only needed to restore the arable land to its pristine vigor, and to secure careful husbandry. This will, before many years, become a necessity for our population has already reached a parallel of longitude going westward beyond which rains do not descend. We cannot for very many years depend upon virgin soils, and must look to some mode of restoring or retaining their original strength and productivity."

There was little opposition to the bill, although it was changed somewhat in both houses: some wanted the new agency to be a department under a secretary who would be a member of the

cabinet; others wanted only a bureau; some wanted a bureau that would be independent and others thought it should remain a branch of the Department of the Interior; some wanted the agency to assume broad powers and others thought its mission should be precisely limited. In the end, and with only flashes of opposition reflected in the journals of Congress, the bill was passed and an independent department under a commissioner without cabinet status was created. Lincoln signed the bill on May 15, 1862.

In his perceptive, monumental history of the administration of the United States government, the late Leonard D. White pointed out that the creation of the Department of Agriculture represented something new in the Federal establishment. It was, he wrote, "the first client-oriented department; it was firmly based on science; it had a strong sense of mission; and it represented a new set of relations between the Federal and State Governments. Beyond these outstanding characteristics, the Department, after it acquired Cabinet status in 1889, enjoyed superior leadership in a succession of able Secretaries and famous scientists who were in charge of its fortunes." Earle D. Ross, on the other hand, warns against assuming that what the Department has become was implicit in its founding and reminds us that the new agency was launched under political rather than scientific auspices. John M. Gaus and Leon O. Wolcott have suggested that the early development of the Department was similar, in some respects, to the development of a university. This is certainly true if its development is compared to that of the State universities that were in process of finding themselves during the same period. Their aims were fairly clearly formulated: they would teach, they would preserve, and perhaps augment, the great store of inherited knowledge. Their difficulty lay in translating the word into the deed. The new agricultural colleges called into existence by the Morrill Act also faced the problem of what to do and how to do it.

Perhaps some persons, looking at the year to year progress of the Department from 1862 on, would think progress slow and groping. But if one looks at the Department 50 years after Lincoln complained that agriculture was represented in the Federal establishment by a single clerk, then it is clear that truly amazing things had happened. The clerkship had exhibited the marvelous fecundity that comes from reproduction by mitotic division. The Department in 1912 claimed almost 14,000 employees including within their number many of the distinguished scientists of the country and some of the best known. In addition to its staff in and around Washington, it had a field staff and had formed a cooperative relation with the colleges of agriculture in the States throughout the Nation. Moreover, it supervised experiment stations in Hawaii and other overseas possessions and thus was, to an extent, an international institution. In some respects it had become a national university in that it conducted research in a large number of fields, and it sought to teach the Nation's farmers. It also served as a kind of agent for the agricultural colleges in the Federal Government and before Congress. Directly and in conjunction with the experiment stations it had become a most assiduous publisher and distributor—one whose books, monographs, and bulletins reached more farmers oftener than the mail order catalogues.

Midway in the half century under discussion this growth was punctuated, in 1889, by the elevation of the Department to cabinet status, headed by a Secretary. During the 27 years as a department without cabinet status, six Commissioners and one acting Commissioner served. Thereafter, three Secretaries, if one disregards the three-week tenure of Norman Colman, held office from 1889 to 1913. None of the Commissioners can be credited with having obstructed the growth of the Department and several, Capron and Colman particularly, made substantial contributions.

Jeremiah Rusk, the first full term Secretary, was an unusual man. He came to the office immediately after serving three terms

as Governor of Wisconsin, and was known throughout the country for his terse explanation for ordering guardsmen to fire on rioters in Milwaukee in 1886: "I seen my duty and I done it." This statement was almost enough to win for him nomination as Vice President on the Republican ticket in 1888. Rusk was not a highly literate man—his biographer for the Dictionary of American Biography said simply that he was not a reader—but he was a perceptive and intelligent person. As Governor of Wisconsin he had lent the weight of his office in persuading the legislature to adopt the law establishing the experiment station at the University in 1883. No doubt he understood and supported a farmer constituent who declared that what the farmer wanted and had a right to expect from the Wisconsin College of Agriculture was that it bring science down out of the sky and hitch it to a plough. Rusk also supported the State appropriation to establish the first farmers' institutes, in 1885, and was quick to seek additional funds for them when these institutes proved both popular and useful. A man of broad vision and of boldness, he encouraged the Department to expand during his four-year term. He was followed by J. Sterling Morton, a conservative from the State of Nebraska, whose limited views on what was appropriate for government to do placed him in harmony with President Cleveland. Morton was succeeded by that remarkable Iowa farmer, professor, and politician, Tama Jim Wilson, whose term of office extended from the first days of McKinley to the last days of Taft—from 1897 to 1913. When he left office, the Department consisted of a number of well organized bureaus in which related work was grouped.

Isaac Newton, the first Commissioner, formulated a set of objectives for the Department, shortly after taking office in 1862. The Department was to collect statistical information, it was to search for new valuable plants and animals, it was to provide information to farmers, it was to test farm implements and conduct chemical analyses, it was to establish a professorship of

botany and entomology, and was to establish an agricultural library and museum. Some of these objectives, already spelled out in the law, were relatively easy to attain and simply needed appropriate organization and staff; others, such as testing farm machinery and developing an agricultural museum, were attempted and then, after a time, dropped or altered. Concern with plants and plant diseases led to a substantial program and, in the unfolding of the Department, brought about, as early as 1876, some work on forests which reflected both Departmental interest and some public concern about the rapid depletion of forests and the possibly vital connection between forests and climate and stream flow.

In 1878 a division of veterinary medicine was organized and seven years later the Bureau of Animal Industry was created with regulatory responsibility that was increased with the Meat Inspection Act of 1890. Within the Bureau of Animal Industry occurred one of the early brilliant pieces of research in locating the causes of cattle fever. Cattlemen had long been persuaded that the disease was related to ticks because it disappeared when the ticks disappeared. In the middle 1880's Theobald Smith, trained as an M.D., was placed in charge of the investigation. As assistants he had two veterinarians, F. L. Kilbourne, who knew cattle and the cattle ranchers, and Cooper Curtice, who knew the biology of the tick. Working together these men discovered that the tick was indeed the intermediate host of the micro-organism that caused the fever. The discovery, preliminary reports of which were published in 1890, was of first importance: it offered exact knowledge needed to combat the cattle fever; it opened a vast new field of research into animal and human diseases; but perhaps most important of all, it demonstrated the value of collaborative investigation of problems which, because of their complexity, required specialized knowledge and techniques drawn from several disciplines as well as practical knowledge and experience. A host of other notable accomplishments include Marion Dorset's investigations into hog cholera.

The search for new plants and animals continued and was enlarged. Innumerable successes were recorded, but once a plant or animal was successfully introduced, memory of its introducer began to fade. There was a tendency to remember only the exotics that failed to find a place in American agriculture such as tea, which several Commissioners thought would find a successful home in the United States, the silkworm, and a number of sugar sorghums. The cursory interest in introducing ostriches into southern California—birds of both abundant and pleasing plumage—suggests that the Department was moving in the right direction but, as Hollywood later made obvious, with the wrong species of biped. Before the century had run out the plant hunters who roamed the world to the profit of American farmers and the improvement of American standards of living were authorized by law.

In 1883 most of the chemistry activities of the Department were gathered together under that remarkable man, Harvey Washington Wiley, to form the Division, later Bureau, of Chemistry, and some work was begun on the analysis of foods. Later the Bureau would have the assistance of State departments of agriculture and of the agricultural experiment stations. In the late 1880's many people began to be concerned with food adulteration and misrepresentation. The problem was not new. Instances of adulteration are found throughout recorded history, and one of the original English colonies could claim the invention of the wooden nutmeg. But the rapid technological advance that came after the Civil War opened many new opportunities to unscrupulous food processors. There might have been something mildly amusing about finding a frog in the milk, but it was quite another thing if substantial amounts of alum or ground limestone turned up in the flour. Strawberry jams made of apples and alfalfa seed or lamb turned into potted chicken were not amusing. Vermont maple trees, it began to appear, were as prodigious in yielding sap for syrup as the good ship *Mayflower* was in furnishing furniture

and ancestors. Chemical analysis of foods, both in the Bureau and at the experiment stations, with, it must be added, a direct assist from Upton Sinclair, led directly to the adoption of the Pure Food and Drug Act in 1906 as well as additional meat inspection requirements. Upton Sinclair's book, *The Jungle*, had aroused great concern. As Mr. Dooley said, it was ideal reading for Lent, and he insisted that it had made a vegetarian of that strenuous, red-blooded, ex-cattle rancher, Teddy Roosevelt. In this development the Chief of the Bureau of Chemistry, Harvey Washington Wiley, attained national fame which for a time made him into a folk hero.

After the turn of the 20th century, the Department went through a substantial reorganization analogous to that of many universities when they reached the point of exfoliating into a number of colleges. The Department was reorganized into a group of bureaus; chemistry and animal industry were joined by forestry, soils, plant industry, statistics, and biological survey—which, with others still to be created, suggest the widening interest and responsibility of the Department.

Also of great importance was the emerging relations with the colleges of agriculture. In the years immediately following the adoption of the Morrill Act, the college administrators exhibited some suspicion of the Department, but there were occasional meetings of representatives of the colleges and the Department in the 1870's. With the rise of the experiment station idea in that decade, Department officials and college administrators learned to make common cause in seeking Federal funds for the support of State experiment stations. The appropriation was obtained in the Hatch Act of 1887. This called into existence the Office of Experiment Stations within the Department of Agriculture, which first served as a clearing house and coordinator of the work in the stations and later was responsible for making sure that expenditures of the experiment stations were audited by the Federal Government. In the development of relations between the Depart-

ment and the stations, the audit was probably far less important than the fact that the scientists of the Department and those in the stations were men of common training, interests, and goals. The act of bringing the administrators of the colleges together to lobby for the Hatch Act also set the stage for the organization of a national association of agricultural colleges through which the demands of the colleges could be reflected. The Office of Experiment Stations undertook the task of editing the proceedings of the annual meetings of the association and, until 1910, the United States Department of Agriculture published them as bulletins of the Department.

The experiment station development, with its close and intimate connection with the Department of Agriculture, represents a unique achievement as a national cooperative research establishment supported by State and Federal funds. It was important for the scientific investigations conducted; it was important for demonstrating the fruitfulness of collaborative research so brilliantly revealed in the cattle fever inquiries; and it was also important, in a much more subtle way, in providing the example of how organized research could be conducted.

Moreover, in the relationship with the State colleges of agriculture, the Department's interest in and contribution toward the development of extension work was of considerable importance. From the earliest days of the first agricultural society, the improvers sought better ways of reaching the farmer. In the 1870's farmers' institutes were devised in some of the States and in the 1880's they became very popular. Rusk urged that Departmental officials interest themselves in institutes and many did. After the turn of the century a further step was taken. Seaman Knapp, in his demonstration experiments in the South, and agricultural teachers in Utah, Pennsylvania, Wisconsin, and elsewhere, began to experiment with what would be called the agricultural representative or the county agent. He was to provide the living link between the farmer and the now vast research establishment of

the Department of Agriculture and its affiliates. In 1914 a Co-operative Extension Service, with grants of Federal funds to support county agricultural agents, was established—52 years after Lincoln asked the Congress to give the single clerk some help.

Leonard White, whose words I had occasion to quote earlier, offers an appropriate concluding statement: "The key to the success of the Department of Agriculture consisted in the quality of its leadership and of its scientific corps. Both science and administration contributed to its vitality, and both were essential ingredients to its success. The Department served the interest of an important segment of the American economy from which it doubtless derived political strength, and in this respect as in others it differed from its sister agencies. It avoided in large measure the handicaps of patronage, partly because its work was highly specialized, partly because Secretaries, bureau chiefs, and division heads had work to do that required competence and stability. In a period when laxness and indifferent standards were common, the record of Agriculture stood out in bold relief as a gratifying symbol of political achievements in administration and in service to the American people."

THE DEPARTMENT AS I HAVE KNOWN IT

Henry A. Wallace

For more than half of its existence I have been in rather close contact with the Department. Tama Jim Wilson, who was Secretary of Agriculture for 16 years, longer than any cabinet member ever served in the government of the United States, used to visit in our home when he was still Dean of Agriculture at Ames. When he went to Washington he sent me stamps from various foreign countries. His daughter was a close friend of my aunt. In 1913, after he ceased to be Secretary, he and my grandfather traveled in Europe together and when he came back he made a rather extensive report on tenancy conditions as related to soil fertility.

The high point of my contact with James Wilson was in June of 1912 when the Republican Convention was in session. The old Republican war horse, knowing he would be out of office after March 4, 1913, invited me to spend a week with him and to go over the entire Department with a trusted guide. In those days the Department buildings were somewhat different. This canny old Scot—he was born in Ayrshire—obtained from the Congress an insufficient appropriation to build the building the way he wanted it. He decided to build one wing on the east and one on the west, leaving the center open, figuring that some day the gap would have to be closed. Tama Jim drove down to the Department behind two fine horses with great éclat. It was a real wrench with the past for my father to do away with those horses

Henry A. Wallace served as Secretary of Agriculture, 1933-1940; as Vice President of the United States, 1941-1945; and as Secretary of Commerce, 1945-1946. He had previously edited Wallaces' Farmer. Mr. Wallace's wide interests have extended over the fields of genetics, corn breeding, and economic and political problems, and he has written extensively in all of these fields.

in the summer of 1921. Old Sandy departed, the horses departed, and the Department has never been the same since. He drove up to the old brick building along lovely curved roads. It was beautiful; it was agricultural. Now you are efficient.

Each evening Secretary Wilson asked for my impressions. The contacts I made with the wise old Bureau Chiefs, such as W. A. Taylor of the Bureau of Plant Industry, during that period left an indelible impression. I became confirmed in my belief that scientific curiosity, idle curiosity, if you please, is one of the most precious of all assets. Few organizations have been so alive with scientific curiosity as the USDA over the 100 years of its existence. The Graduate School which my father and E. D. Ball organized 40 years ago, and in which Henry C. Taylor, to whom the Department owes a great deal, was active, has helped to stimulate this curiosity. Dr. Ball, then Director of Scientific Work, served as the first director.

While I have been familiar at first hand with the Department during the past 50 years my knowledge of the early years has been somewhat scanty. I therefore looked up the enabling legislation which was approved on May 15, 1862, and found that the salary of Isaac Newton, the first Commissioner of Agriculture, was \$3,000, that he was empowered to gather agricultural statistics, to collect and distribute valuable seeds, conduct scientific experiments in the fields of chemistry, botany, entomology, etc. To make sure that the Commissioner did not run off with any money he was required to put up a bond of \$10,000 with the Treasurer of the United States.

During the first year of its existence the USDA spent approximately \$60,000. Commissioner Newton in his first report estimated that for the second year the USDA would need \$130,000. One of the great activities of the USDA was to distribute 306,000 packets of seed largely through members of Congress. Toward the close of his first report submitted by him and Abraham Lincoln to Congress on January 1, 1863, Isaac Newton said, "The

United States are, and must always remain, an agricultural nation." He foresaw that in the lifetime of those then living, the United States would have 100 million freemen. He finished on a high note: "May we not hope and devoutly pray that, taking warning from history and the signs of the times, our republic may so learn lessons of wisdom, that, eradicating all destructive tendencies, she will fortify herself against decay, and become, what Rome was not—eternal?"

Tama Jim Wilson in a big way carried out what Isaac Newton had started in a small way. Above all he was interested in starting new crops in the United States. I remember him sending to members of our family sugar-beet seed to try out. He was a protectionist and thought we ought to grow more of our own sugar. He was proud of the plant introduction work, which was so ably headed by David Fairchild for so many years.

During President Woodrow Wilson's regime my contacts with the USDA were very limited. However I did get in touch with the corn-breeding people at that time. I was also in touch with the Weather Bureau which at that time had taken an interest in correlations between weather and corn yields.

There was little extension work in 1912 but there had been Short Courses set up earlier in various States to promote grain and livestock judging. I attended one of those Short Courses in Iowa 58 years ago. The college people had not yet learned very successfully to bridge the gap between science in the laboratory and practice on the farm. I learned that because I sat with the farmers and heard what they had to say. M. L. Wilson, one of the extension leaders, was an exception. He had learned about human nature from P. G. Holden. I am glad that the Graduate School is going to emphasize the study of the humanities a little more than they have in the past. At any rate, Hog Feeders' Days, Cattle Feeders' Days, and Farm Crops and Fertilizer Days began to blossom. In a twinkling of an eye about 1913 everything began to change, and farmers by the million became eager to learn.

Federal legislation set up the county agent system on a nationwide basis in 1914. The first county agent had been appointed in 1906 in Texas. Other States had quickly adopted the idea.

The Office of Experiment Stations and the Extension Service in the USDA worked out unique machinery designed to get the greatest possible increase of agricultural output State by State and county by county with the minimum of Federal input in terms of dollars and coordination. The more well-to-do farmers banded themselves together to cooperate with that system under the name of Farm Bureaus. World War I opened many doors to agricultural expansion as well as agricultural depression. The Extension Service was long on expanding agricultural production but short on understanding the economic nature of the post-war boom and bust.

My father, when he became Secretary of Agriculture on March 5, 1921, was keenly aware of the need for greater economic understanding of the sudden change in farm demand brought about by the end of the war. The farmer was in trouble. Henry C. Wallace proposed to do something about it. Fortunately, Secretary Houston had set up an Office of Markets in 1913 based on an act which President Taft had signed the last day that he was President. There had been for a long time a Bureau of Statistics which did crop and livestock estimating. An Office of Farm Management and Farm Economics had been set up in Secretary Houston's office in 1919 with Henry C. Taylor in charge. Within four months after my father became Secretary of Agriculture, he began to consolidate the economic work of the Department and put it under Henry C. Taylor. The consolidation was completed with the establishment of the Bureau of Agricultural Economics on July 1, 1922.

Taylor did many dynamic things in cooperation with my father, one of the most dynamic being the establishment of the Outlook Reports. Taylor talked to me about this before the first Outlook Conference was held in late April of 1923. He told me

my father was greatly interested in getting this guiding information into the hands of the farmer. Taylor and I were even more excited.

The Department now went beyond "intentions to plant" into business prospects. This aroused much criticism. But Father and Taylor were both red-headed and never drew back from a fight if they thought they were right.

The same year, on July 1, 1923, the Bureau of Home Economics was established under the leadership of Dr. Louise Stanley. Ten years later, I suggested to Dr. Stanley that it would be a good idea to draw up compilations of minimum American food requirements and maximum possibilities of healthful consumption. These compilations, prepared by Hazel K. Stiebeling, provided standards for measuring the adequacy of diets and for the type and quantity of crops needed during the depression crisis and World War II. I am glad that the Department has done this sort of thing for the entire world. The World Food Budget is a major contribution.

In January of 1922, President Harding at the suggestion of my father called an Agricultural Conference. I happened to sit on the same committee with the great labor leader Sam Gompers. My particular program of "Less Corn, More Clover, More Money" made Gompers angry. He looked on it as agricultural feather bedding and said there could not be an agricultural surplus as long as there was a single hungry Chinese or Hindu.

At that time I felt that both business and labor were unfriendly to agriculture. I felt agriculture had to have equality of bargaining power. Out of that 1922 Conference came eventually the first McNary-Haugen Bill which was slaughtered in June of 1924 by a coalition of conservative Democrats and Republicans.

When my father died in office in October of 1924 I decided not to go near the Department for a time. During those days, as an editor, I referred on various occasions to what I called the "Ever-Normal Granary." My Washington contacts in 1927 and 1928

were those of a lobbyist for the McNary-Haugen Bill which twice passed both houses of Congress and was twice vetoed by President Coolidge. Dr. Henry C. Taylor had been forced to resign as Chief of the Bureau of Agricultural Economics because he had been too close to my father and too active in the McNary-Haugen Bill fight. Certain business interests felt farmers should produce abundantly but not think too much about relating production to consumption. I suspect the scientific bureaus of the Department were uneasy about the idea of the Department getting into economics and therefore indirectly into politics. At any rate, my father died, Taylor resigned, and certain business interests felt that the Department was in safer hands. My father had been responsible for the passage of the Packers and Stockyards Act which did not endear him to the agricultural processing trades.

During the late 1920's it became obvious to even the conservatives that the agricultural problem was much more than a matter of personalities and that government could not duck the responsibility for a situation which had its sources largely in World War I. The Hoover Administration set up the Farm Board under the vigorous leadership of Alexander Legge with a half-billion dollar appropriation to deal with farm surpluses.

High foreign tariffs on grain, rapidly declining markets overseas, world-wide unemployment, and overproduction in the United States of farm products destroyed the Farm Board as a price making force. Alexander Legge in his desperation called out for shooting every third cow and plowing under every third row of cotton.

In a 1930 editorial, I suggested that the Farm Board should do more than outline the dilemma and exhort farmers to grow less wheat. It should analyze the handicaps and advantages of different types of solutions. The situation was acute enough, I thought, to warrant government purchase of marginal land so that it could be held out of production until needed. The dilemma of high tariffs, expanding agricultural technology, disappearing foreign

markets, shrinking domestic markets, and the piling up of surplus food, as well as proposals for solving the dilemma, should be presented to farm people not only by the Farm Board but by the United States Department of Agriculture. With some farm organization leaders, I suggested to Director Warburton of the Extension Service that county agents should be responsible for discussing the way in which economic policies affect agriculture and the adjustments needed to carry out these policies. During this period, I suggested that the Department of Agriculture needed to face the economic problems which were caused in part by increased technological efficiency. I said that the Department which brought about increased production should have responsibility for solving the economic problems thereby created.

By 1931, it had become clear to most supporters of the McNary-Haugen plan that the situation in Western Europe was so bad that export dumping would not be enough to help the farmer much. M. L. Wilson of Montana began during 1931 to promote the voluntary domestic allotment plan designed to raise prices of farm products in the United States without increasing the surplus. During 1932, he was a veritable evangelist, working with representatives of insurance companies, farm organizations, and others.

By 1933, when I became Secretary of Agriculture, the situation was so desperate that more than one approach was required. Rexford G. Tugwell, then Assistant Secretary, and I went to see President Roosevelt on March 8, 1933. We persuaded him that Congress should act on agriculture in the first emergency session. He agreed, and in a stirring message to Congress on March 16 recommended a farm program, calling it an experiment "on an untrod path." Under the Agricultural Adjustment Act of 1933 and other emergency legislation, we contracted with farmers to adjust production; made government loans on crops; distributed surplus food to the needy; and, generally, attempted to restore the agricultural economy. These programs brought many ad-

ministrative problems. Such problems are always with us. I was fortunate in having Paul Appleby to take over the responsibility for the complex and difficult problems of administrative organization.

The serious drought of 1934 and the invalidation, in January of 1936, of the processing tax for financing the first Agricultural Adjustment Act focused our attention on soil conservation and the need to establish an ever-normal granary. My grandfather, one of the founders of the conservation movement in the United States, had felt sick at heart when he saw rich land eaten away by erosion. He used to speak of the "voiceless land." He did not live to see the dust storms of 1934, 1935, and 1936 which swept the top soil of the Great Plains as far as the Atlantic Ocean, darkening the cities and even the Capitol. Under authority of the Soil Conservation and Domestic Allotment Act of 1936, the Department launched a positive attack on the dual problem of soil destruction and unbalanced cropping. It recognized conservation of the soil as a national problem and offered payments to farmers for shifting acreage from soil depleting row crops to soil conserving legumes and grasses. Under this program, 30 to 40 million acres of land were annually shifted from soil depleting to soil conserving crops.

Before the Supreme Court invalidated the AAA in 1936 we had prepared the way for a genuine Soil Conservation Program worked out by democratic planning, county by county and State by State. In the spring of 1935 we had put up to the State Extension Services the job of planning, by cooperation with leading farmers in the different counties, the best acreages by crops for soil conserving and farm management purposes. Then in August and September of 1935 the State leaders were brought together in Regional Conferences. One of the most profound experiences I enjoyed while Secretary of Agriculture was sitting in on the Regional Conferences and then discussing the problems at the national meeting of the Land-Grant Colleges and Universities in

November of 1935. At the regional and national level skilled scientists and economists surveyed the acreage dispositions which had been worked out on the basis of land use. As a temporary measure in our reductions of wheat, corn, and cotton acreage we had been forced to rely largely on historic bases. We wanted in 1935 to get more and more onto the basis of proper land use and then relate the figures obtained in that way to the market demand and dietary needs at home and overseas.

After the passage of the second Agricultural Adjustment Act in 1938 we reached an agreement with the Land-Grant Colleges at Mt. Weather, Virginia, for the establishment of land-use planning committees in every agricultural State and county. I have long thought that the 1935 meetings and the land-use planning committees were splendid examples of democratic planning in action.

Our democratic land-use planning on a national scale went hand in hand with the intensive job done by the Soil Conservation Service, working through Districts. The Soil Conservation Service, first called the Soil Erosion Service, had been transferred to the Department in 1935. Its head, Hugh H. Bennett, used dramatic and colorful methods to awaken the Nation to the menace of soil erosion. As Secretary I had the pleasure of going to the President with a letter for the President to send to the governors of the different States suggesting legislation which would clear the way for setting up locally desired Soil Conservation Districts. Thus we laid the ground work for a two-pronged attack on soil destruction as brought on by over-grazing and excessive use of row crops.

The Department's interest in conservation did not, of course, begin in the 1930's. Tama Jim Wilson had established a Forest Service along modern lines in 1905 under the inspiring leadership of Gifford Pinchot. When Wilson bowed to the forced resignation of Pinchot in 1910, the ground work was laid for the Bull Moose Movement of 1912.

Saving of physical resources is not an end in itself and cannot be accomplished without saving the people on the land. The greatest rural poverty is found in regions where destruction of the soil has been most severe. When the Resettlement Administration was transferred to the Department of Agriculture, January 1, 1937, more than a million farm families had total incomes of less than \$400 per year and half a million lived on land too poor to justify continued cultivation. Through our rural rehabilitation and tenant purchase programs we made marked progress in conserving human as well as natural resources.

Another agency of major importance in raising the standard of living of farm people and an important tool in the development of commercial agriculture is the Rural Electrification Administration, which became a part of the Department in 1939. I predicted at that time that REA would have "an influence on farm life somewhat comparable to that which has been brought to pass by the automobile and the hard roads."

As we worked on farm programs during the 1930's we were always conscious that only half of the farm problem was to be found on the farm. Farmers had a responsibility to city consumers. Their livelihood was dependent upon the purchasing power of consumers. We were greatly troubled during the depression by the paradox of want in the midst of plenty. Physical scientists had found ways to step up agricultural production beyond the imagination of our grandfathers. The Food Stamp Plan, inaugurated in 1939, and the School Lunch Program were two of the most promising devices we used to provide better nutrition for families unable to buy adequate food at market prices.

The replacement of food surpluses by shortages and the increased rate of employment resulted in the suspension of the Food Stamp Plan in 1943, but the School Lunch Program has remained in effect. Recently the Food Stamp Plan has been revived in a number of areas on a trial basis.

The Ever-Normal Granary Program was initiated, under authority of the Agricultural Adjustment Act of 1938, to insure adequate supplies without gluts or shortages. It provided crucial supplies to meet world-wide needs during World War II and the post-war food crisis.

Those of us who formulated the Ever-Normal Granary Program had in mind that supplies might eventually be needed in case of war. But none of us at that time visualized how important these supplies might be to war-stricken territories during the years immediately following the declaration of peace. The Ever-Normal Granary idea had occurred to me in the early 1920's and I began actually promoting it during the drought of 1934.

The Ever-Normal Granary idea appeals to me as an idea that has relevance today and one that could be utilized in meeting our obligations to the free world. In an address before the International Conference of Agricultural Economists, on August 27, 1938, I suggested that it would be desirable to gradually work out "an International Ever-Normal Granary first with respect to wheat and, eventually as we learn our lesson from wheat, with other raw materials." I brought up the idea again during 1942. In a January 1942 article published by the *Atlantic Monthly*, I said, "As part of the effort to win the peace, I am hoping that what may be called the 'ever normal granary principle' can be established for a number of commodities on a worldwide scale."

The idea was recommended by Sir John Boyd Orr, during 1946, when he was Director-General of the Food and Agriculture Organization of the United Nations. He called the proposed organization a "World Food Board."

I believe establishment of a strategic reserve in this country and other countries is all-important today. Such a reserve can be used to develop backward nations to a point where they can help themselves. Our problem is to turn surpluses into a blessing instead of a curse. Public Law 480, passed in 1954, was a step in the right direction, but we must go further in using our agricul-

tural surplus and our technology as a positive force for the promotion of human welfare and peace.

We cannot turn our backs on science or on world hunger. When I was Secretary many people suggested that we should greatly curtail or halt altogether our scientific research programs because they contributed to the surplus problem. Since I left the Department in 1940, farm workers have been increasing their efficiency at the rate of 4.6 percent a year. One farm worker today can support 26 people. In 1940 one farm worker could support only 11 people.

In 1940, looking back over the 8 years I had been Secretary, I stated that I was proud I had not allowed the scientific work of the Department to decline. I wrote:

Science, of course, is not like wheat or cotton or automobiles. It cannot be over-produced. It does not come under the law of diminishing utility, which makes each extra unit in the stock of a commodity of less use than the preceding unit. In fact, the latest knowledge is usually the best. Moreover, knowledge grows or dies. It cannot live in cold storage. It is perishable and must be constantly renewed. Static science would not be science long, but a mere junk heap of rotting fragments. Our investment in science would vanish if we did not freshen it constantly and keep in training an alert scientific personnel.

We should be proud of our ever expanding agricultural technology. Properly used, our technology and our surpluses represent national strength, not weakness. Only in agriculture is it definitely certain that we shall remain superior to the rest of the world for many years to come. Food and our technological skills properly used can help the crowded hungry lands into a position to help themselves. To do this in a manner which makes friends out of sensitive, highly nationalistic countries is a supreme challenge.

During the past 15 years my Department contacts have been largely with scientists, particularly in the field of genetics. Soon after I became Secretary I had set up a Genetics Committee under

the Chairmanship of O. E. Reed of the Dairy Bureau. I had worked through him to bring about the importation of Landrace hogs and Red Danish cattle into the United States. I had worked through him to bring about the 1936 and 1937 Genetics Yearbooks. I wish they could be brought up-to-date. In the 1937 Yearbook I learned about the romance of the true ancestry of many plants, especially of strawberries and gladioli. I suppose I have interchanged more than 100 letters on strawberries with D. H. Scott and George Darrow. Continually I crossbreed strawberries and grow them from seed. Each year I wait to see what they look like the next year. I recommend to all of you that you become gardeners. Then you will never die, because you have to live to see what happens next year.

I hope that along with its remarkable scientific work the Department will do such a skillful job in cooperation with the farmers and the State Department that farm income will be increased and peace preserved in the hungry parts of the world. Scientific understanding is our joy. Economic and political understanding is our duty. Our objective is the understanding of life at all its varied levels. In its 100 years of experience and the service of thousands of dedicated men and women the Department has contributed mightily. May it remember Commissioner Newton's inspiring vision during the next 100 years—that we may have life at all levels and more abundantly.

THE LAND-GRANT COLLEGE: PAST AND PRESENT

James H. Hilton

It is, I assure you, a distinct honor to participate in your seminars commemorating the hundredth anniversary of the founding of the United States Department of Agriculture. I congratulate you on a century of distinguished service to the people of America and to the peoples throughout the world.

The Department and the Land-Grant Colleges and Universities have many things in common. We are the same age and we have grown up together. Our objectives and our problems have been similar in nature. We have joined hands in many cooperative programs and through our joint efforts we have in this country today the greatest agricultural industry of any country in the world. Iowa State University has always enjoyed its close associations with the Department. I like to think that this close cooperative relationship between us typifies the ideals and objectives our founding fathers had in mind when the Department and the Land-Grant Colleges came into being almost a century ago.

For almost 100 years, the educational role which the land-grant college should play in American society has been the subject of discussion, debate, and at times, even controversy. Born out of a Congressional compromise, which tried to incorporate into the colleges' educational program at least two different philosophies on educational needs, the land-grant colleges were given

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no single, well-defined function. The new colleges, according to the Morrill Act, were to be scientific, technical, vocational, and practical in their educational program. But they were also to give their students that broad, liberal education which would equip them for responsible democratic citizenship.

Despite the somewhat general wording of the Morrill Act, however, the new public colleges were indisputably charged with two central purposes. These purposes are more basic to the nature of the land-grant college than is any particular type of educational program. The first of the purposes was to serve the people's needs. The land-grant colleges were charged with the responsibility of providing young men and women with the kind of an education which would make them most useful to an ever-growing and ever-expanding, dynamic society, and would also equip them as individuals to make more satisfactory lives for themselves. The second purpose with which the colleges were charged was to provide the American people with equal access to educational opportunity. The new colleges were commonly called "people's" colleges. They were to belong to all the people. Their doors were to be open to all.

The general multi-purpose educational program authorized in the Morrill Act has been a positive good. It has meant that the land-grant colleges have been *free to achieve their basic educational purpose of serving the people's needs*. The land-grant colleges have not been restricted to any one particular kind of educational program. They have been able to experiment and innovate. They have been able to develop the kind of educational and service programs which could best serve society's needs. They have been free to modify and adjust their programs to fit men's ever-changing environment.

At any one point in history, the kind of an educational program through which the land-grant college or university can effectively accomplish its central purpose of serving people's needs depends upon the kind of environment in which people live.

The America into which the land-grant college was born was a world of scarcity. Although 60 percent of the population was engaged in farming, the young Republic's subsistence type of agriculture could not adequately meet the food and fiber needs of a population which was increasing by one-fourth to one-third every 10 years. A large portion of that 19th century population was actually underfed from a nutritional standpoint. Most Americans' diet was meager and monotonous.

Therefore, even modest increases in family incomes caused a fairly large rise in the demand for food. As a developing industrialism brought about an increase in per capita income, the demand for food generally kept rising during the 19th century. Moreover, such technological advances in transportation as the railroad and the steamship were bringing American agricultural products into international demand. The need was for more and more agricultural products. The great need during the last half of the 19th century, and the early years of this century, was to develop an agricultural science and technology which could keep pace with the technological advances of our rising industrialism. For the ways of agricultural production in the 1860's were much the same as they had been for centuries before. Therefore, probably the most socially and economically useful function which the agricultural divisions of the new land-grant colleges could perform was to develop programs in teaching, research, and later extension, which taught farmers how to produce more abundantly. Because of the work of the land-grant colleges and the U. S. Department of Agriculture, our agricultural plant has been revolutionized in the past 100 years. No other nation can produce so much food and fiber with so little labor. In the brief span of a century, our ability to produce has been multiplied by at least five times.

Not only did the young republic's subsistence type of agriculture fail to meet the nation's food and fiber needs, but manufactured goods were barely trickling out from America's young and

undeveloped industrial plant. The need was not only for the "consumer saving" which supplies the resources for building a great capital plant. The need was also for the growth of a body of scientific and technical knowledge, out of which could come the great scientific discoveries and inventions, which have made our factories truly productive and have given Americans, as consumers, an amazing variety of mechanical conveniences and comforts. Therefore, one of the great responsibilities of the land-grant colleges has been to further the growth of scientific and technological knowledge.

In the fields of science and engineering, the achievements of the land-grant colleges have been notable. The land-grant college pioneered in the movement to bring science into educational curricula. Within the research and teaching programs of the land-grant colleges, large bodies of scientific facts have been discovered and accumulated. Basic principles and experimental methods have been developed and tested. Complicated laboratory equipment has been invented. The young science graduates who have been pouring out of our land-grant colleges since the turn of the century are now manning the great research undertakings of both industry and government. Our land-grant colleges today must share a large part of the credit and responsibility for the scientific and technological progress America has made in the past 60 to 75 years.

We all know that the America of the latter half of the 19th century and early 20th century had its social, economic, and political inequities and injustices which cried out for remedy. But from the long historical perspective probably the first need of American society during that period was to develop an industrial and agricultural plant which could produce that material abundance which makes real social and economic justice possible.

The role which the land-grant college has played in increasing America's capacity to produce can hardly be over-estimated. Today, given the time and money, we can master almost any pro-

duction problem. The work of the land-grant institutions has contributed mightily to this level of America's educational and scientific achievement. The job which the land-grant college has accomplished has made it one of our most important social institutions. Today the land-grant institutions enroll more than 20 percent of the college students, grant 40 percent of the country's doctoral degrees in all subjects including approximately half of those in the sciences, engineering, and health professions, and 25 percent in the arts, languages, business, and educational training. They have been instrumental in extending the teaching of the humanities throughout the country. Objectively appraised, at the close of its first century, the land-grant college has generally fulfilled its central purpose of serving men's needs as they existed in that century. It has operated efficiently and effectively in terms of the problems with which it has dealt.

But the contributions of the land-grant colleges and universities to the progress and well-being of mankind does not end at our shores. It extends to most countries of the world. The foreign students educated in our land-grant institutions, and the various technical assistance programs in the underprivileged countries, together with the cooperative programs between American land-grant universities and universities of foreign lands have made the contributions of the land-grant colleges world-wide in scope. This is perhaps America's greatest contribution to world-wide education.

This, then, is our past record. And we who are here today are all proud of it. But I often wonder if we in the land-grant colleges are giving enough thought to what our future should be. Are we thinking broadly, yet precisely, on the new problems and coercions which our rapidly changing world is placing upon the land-grant colleges and universities today? What will be the educational needs of this new world? Are we adequately planning for the adjustments which we will have to make in teaching curricula and methods, in research programs, and in extension

activities, if the land-grant colleges are to continue to serve their historic purposes of meeting people's educational needs?

As we all know, the land-grant colleges today like all institutions are operating in a world vastly different from the one in which they were established and lived their first half century. I am not going to catalog these changes which we all recognize, but shall only refer to them briefly to point up the new educational needs which our changing environment is creating.

The world into which Americans have moved during the past 50 years might be variously described. It is a world of material abundance; a world of revolutionary technological advance; an industrialized world in which economic power is held in great blocs; an urbanized world of vast metropolitan clusters, whose standards and values are being rapidly adopted by our shrinking rural population; a complex, interdependent world whose global size is fast shrinking; a world of hydrogen bombs, intercontinental ballistic missiles, and rockets to the moon. It is a world whose inhabitants are experiencing coercions, insecurities, and dangers undreamed of by the inhabitants of the world of 1862.

In such a world as this, we must ask the questions: Are our traditional curricula and teaching methods adequately equipping today's college students for dealing with the problems they will be facing in this latter half of the 20th century society? What are our new educational needs?

Two forces in the modern world have, it seems to me, been more powerful than all others in creating new educational needs. The first of these is the interdependency of our society. The inhabitant of the world today—whether he be a farmer or a city dweller, a laborer in a factory or a member of management, a stockholder or a merchant in a small town—has lost the old independence which his ancestors enjoyed in our earlier agrarian-village economy. His livelihood, the satisfaction he gets out of life, and even his life itself are dependent upon the harmonious workings of a complex network of economic, social, and politi-

cal interrelationships which are national and international in their scope.

Therefore, one of our greatest needs today is to learn how to live and work together harmoniously and justly in a world which has grown frighteningly small. Our growth in social intelligence is lagging dangerously behind our technological advance. We have a hydrogen bomb and an intercontinental ballistic missile before we have the social know-how to control these technological wonders for the benefit of men.

Our colleges and universities today have a responsibility for meeting this growing need for social intelligence. They have a responsibility for providing the kind of an educational program which will give young men and women the social understanding which enables them to perceive their economic, social, and political interdependence; to appreciate the needs and problems of other groups and other nations; to realize that the causes of social and economic ills and political dangers are seldom single-headed and one-sided; to foresee the probable effects of actions proposed for their group or their nation.

The second force in the modern world which is transforming educational needs today is the accelerated tempo at which change is taking place. The students we are training in our classrooms must go out into a society in which change is almost revolutionary. In such a society, the skills and technical competence acquired today may be outmoded in a few years.

Therefore, one of the most useful mental abilities we can give our students today is the ability to make intelligent adjustments to change. This is the capacity, first, to understand that change, historically, is inevitable and to view it with an open mind and with a desire to understand the new relationships and interdependencies which change creates. Secondly, it is the capacity to work intelligently to shape and to control change in the interest of achieving a more abundant and satisfying life for everyone.

Equipping young men and women with such mental abilities might be the most useful and practical education we could give them for facing the world today. Our modern world, however, also demands specialization in its producers. The sheer breadth and depth of our modern scientific knowledge combines with the complexity of our economic and social system to make specialization in training and in occupation almost a necessity. Seemingly, the young men and women who have specialized are best equipped to make a living. Moreover, our need for making further scientific and technological progress requires that specialization in disciplines which gives the scientist the competence to add to the sum total of human knowledge.

Here, then, is perhaps the single most important overall curriculum problem facing the land-grant colleges and universities today. It is the need for finding a fruitful balance between specialized training in the professions and sciences on the one hand, and broad education in the social sciences and humanities on the other.

The land-grant universities, despite their rich offerings in the liberal arts and social sciences, have not yet solved the problem of broadly educating students who are majoring in the specialized scientific disciplines. Nevertheless, the first step that the land-grant colleges must take is to insure that such broad course offerings are adequately available in their curricula. The more difficult task, however, will be that of including an adequate number of these broader courses into each individual student's four-year program of study.

I have been speaking in terms of achieving a "balance" in curriculum between the specialty courses and courses in the basic sciences and liberal arts. But perhaps such course "balance" in the years to come will prove too negative a concept to be useful. Perhaps the time is not too far off when we will be obliged to think more creatively of building curricula around new types of course integration; of developing new syntheses of academic dis-

ciplines. It may well be that the traditional scientific disciplines, which are the product of the meager knowledge of an earlier time, will themselves have to be broken up and replaced by new structures for organizing knowledge. Of course, a lot of these needs are only future probabilities; but certainly we should organize our knowledge in terms of curricula so as best to equip our students for life in a world of unprecedented change.

So much for the need for reappraising and readjusting the formal educational programs which the land-grant college offers to young men and women who come to its campus in search of higher education. There is also a need for reappraising, readjusting, and even reshaping some of the research programs of the land-grant colleges.

The research record of the land-grant colleges has been truly notable. We all know the contributions which the colleges have made to mankind's welfare through their research discoveries in the physical and biological sciences. We all know the part which their research programs have played in transforming the American economy from one of scarcity into one of near abundance.

In a world in which great masses of men are still lacking the bare necessities for existence itself, in a world in which a growing population is pressing ever harder on existing resources, the land-grant college must continue to carry on research which will increase the world's capacity to produce more food, more clothing, more shelter, more of the things which make life comfortable. But our research task can no longer end there. Nor can we assume that our *only* research task today is to make the scientific and technological discoveries which will "put us ahead" in the nuclear and space fields, as vital as these needs may be in the times in which we live.

Today, the land-grant colleges, in their programs of research, must *also* deal with the complex problems of economic and social adjustments, which are so important to men's welfare and survival. Increasingly, the orientation of our research must be more

around people and their welfare. Sometimes we have concentrated too much on how to adapt the conditions of nature, without regard for their impact upon people. In our concern for people, we must consider men not only as producers, but as total men. We must consider the family in all of its community and social relationships. We must seek to discover the economic and social arrangements through which individuals and groups of individuals can accommodate themselves to each other's needs and interests.

One of the first needs in organizing a research program which deals with economic and social problems will be—as it has been in the physical and biological sciences—to find a fruitful balance between basic and applied research. In all of our research areas—both old and new—we must withstand the pressures to put too large a share of our resources into applied research. We all know that our applied research projects which have produced immediate, concrete rewards, have drawn their information from the well of basic research. We all know that if our applied research is to continue to be productive and rewarding, we cannot allow the well of basic research to run dry. Fortunately, so many of the recent great “useful” and “practical” scientific discoveries, such as atomic energy, have been so directly the result of the basic research of so-called impractical “theorists,” that today the value of basic research is being more widely recognized and materially supported.

Second, we must recognize the restrictions which limitations in budget, trained personnel, and research facilities place upon the scope and types of research projects undertaken. Although we must work toward building research organizations which will fill all of our new research needs, such a retooling process takes time. In the meantime, we should carefully confine our efforts to those projects which can be adequately carried through. Our limited research energies should not be dissipated and wasted in diverse and scattered undertakings.

Third, many of the new problems which are troubling Americans today are a combination of socio-political and economic factors. The complex in real life does not break down neatly into problems which are either scientific, economic, sociological, or political. The difficulties which confront farm and urban families are no respecters of academic disciplines. And their solution will often require the special knowledge and competence of a variety of disciplines. For example, the problem of revitalizing a local community institution in a new setting may require the combined knowledge of the biological and physical scientist and conservationist, the economist, the social psychologist, the sociologist, the home economist, and the political scientist.

Fourth, we must recognize that we cannot stop at the State line in our investigations of economic and social problems. Such problems do not recognize State boundaries.

The fact that people's economic and social problems transcend State barriers means that the land-grant college system must think and work collectively to solve the large aggregate of overall problems which confront us. It means that new arrangements and procedures for cooperative research among the States and Federal agencies must be developed. We must somehow pool our research efforts.

The problems which the land-grant colleges must solve in building cooperative extension programs which fit the changing needs of people are probably some of the most difficult ones with which the colleges must deal in making their adjustments to the modern times. A variety of conflicting pressures upon cooperative extension are making its task of adjustment extremely difficult.

In the first place, the concept of extension education has vastly changed since extension's beginnings in the first 20 years of this century. The educational problems with which extension services now deal have spread out from such demonstration services as dehorning cattle, culling chickens, or pruning fruit trees

into a bewildering array of farm and home management problems, problems in family living, community problems, and the economic problems of agriculture and public farm policy. Our cooperative extension services now see the farmer not only as a producer and his wife not only as a homemaker, but recognize them as total persons with broad social, civic, and aesthetic interests.

The philosophy of extension education, which is concerned with the total human personality, is the most meaningful concept which could have been adopted. Nevertheless—particularly as the farmer's economic and social problems multiply—such a concept places upon our county extension men and women the frustrating responsibility of providing people with a conglomerate of educational services. Moreover, our growing scientific knowledge in all of the disciplines makes the county extension workers' task even more difficult. For in this day of highly specialized knowledge, they simply cannot be sufficiently grounded in all educational areas, no matter how capable they may be.

Finally, our Extension Services' work load is growing even heavier because of the rapidly increasing number of people who are seeking its educational services. The lines between town and country are becoming blurred. Increasingly, rural people are supplementing their farm income with city employment. City people are making their homes in the country. Our suburbs are billowing out into the countryside. Moreover, city people are becoming conscious that, as taxpayers, they too have a right to share in extension's educational services. Particularly are the services of our home economists in demand by city homemakers. Finally, extension has the democratic obligation of striving to bring its services to those underprivileged rural groups who, although they do not seek its services, probably need them most.

In the face of these accumulating demands upon them, I believe that our cooperative extension services—if they are to continue adequately to serve the needs of people of their State—

must think in a disciplined fashion upon the following questions: (1) *What* educational problems and services can extension deal with effectively? (2) *Whom* can extension adequately serve? and (3) *How* can extension maximize its efforts so that it can serve greater numbers of persons in an effective fashion?

I hope that I am not being inconsistent in believing that somehow we must adjust the number of problems with which extension deals to the size and competency of our county and State extension staffs. Since our democratic conscience will not permit us, as public educational institutions, arbitrarily to limit the clientele we serve, I think we must find the answer to extension's work load in developing more devices such as radio and television through which the extension worker's personality and knowledge can be projected out to hundreds of people whom he or she could not reach in person. We must bring into the services we offer more trained minds in many more fields than has been the case in the past. Moreover, in planning and carrying out our extension programs, we must use the new knowledge which sociology and social psychology are providing us. We must more effectively utilize group action techniques, neighborhood and community groupings, and local leadership patterns.

As we near the close of the first century of our great land-grant college movement, we, in the colleges, have a positive responsibility and obligation to think and plan constructively and creatively for our future. We must face the fact that these are times which demand bold action. For never before have people had to depend more heavily upon their colleges and universities in their struggle to find a direction—an understanding. We must re-examine our goals and our functions in the light of people's changing needs in our modern world. We must ask ourselves if our activities and methods are well designed to fulfill these goals. We must be willing to accept change and to plan boldly for our future. Only if we do these things will our land-grant colleges continue to be the socially valuable institutions which they have been in the past.

CONTRIBUTIONS OF AGRICULTURE TO OUR ECONOMY

Jesse W. Tapp

It is a great privilege to participate in this lecture series on the Centennial celebration of the Department of Agriculture. For me it is an especially sobering experience when I realize that my first contact with the Department of Agriculture was some 46 or 47 years ago, almost half of this century of service by the Department which we are celebrating. I was one of those fortunate farm youngsters who benefited from contacts with the first county farm agent to come to our county in Kentucky. Even at a rather early age, I found a very practical project for testing seed corn both challenging and educational. Out of such contacts grew my determination to go to the College of Agriculture and my hope to become a county farm agent.

It was also my privilege to be a student of the Graduate School of the Department for a brief time in the 1920's. My first job off the farm was with the Department at \$80 per month, and, in retrospect I have always felt that I was overpaid.

From a great variety of contacts with farmers, with the Department, and our land-grant colleges, during most of this century, I have the highest regard for the almost unbelievable progress of our agriculture, for its contribution to our economy, and for the vital role which the Department and related institutions

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have played in making possible these great achievements. I am especially pleased, therefore, to have the opportunity to discuss with you the contributions of agriculture to our economy.

Economic growth has become, and continues to be, a focal issue on both sides of a severely divided world, not only with respect to major countries but with respect to the growth of underdeveloped areas throughout the world. A review of the contributions of agriculture to the growth of our own economy should be helpful to give us a better appreciation of agriculture and a better understanding of the interdependence of the several sectors of our economy. In addition, it may give us some appreciation for the role of agriculture in the growth of underdeveloped countries. What likely is more important, it may increase our awareness of the important conditions under which agriculture can make significant contributions to the growth of these newer countries.

Let me make one side comment that will, perhaps, reveal some of my biases, and then I can return to what I think is the major topic. Although we are here concerned primarily with contributions of agriculture to the economic growth of our Nation, there have been important political, cultural, and spiritual contributions as well. These are impossible to measure, and difficult to discuss. So I will make only an occasional passing remark concerning them.

The Setting

The contributions of American agriculture have been greatly affected by its setting over 100 years ago. First in our minds, I suspect, is our resources. Much emphasis has been placed on the abundance of America's natural resources: our fertile lands, our oil and mineral deposits, and our rivers. And it is true that they were and are abundant.

In the office of the Kern County Land Company there hangs a sign, which reads, "No steer fatteneth so well as the one which scratches its back on an oil derrick." This sign symbolizes the

fact that, for a nation as well as for a private firm, the presence of exploitable valuable resources can greatly enhance economic growth.

But there have been other countries with fertile lands and with rich oil and mineral deposits and many of these have not experienced similar economic growth. In my opinion the uniqueness of our natural resources, great as they are, have been overstressed as factors leading to our economic growth.

More important, to my thinking, has been our heritage of attitudes and the emerging institutions. At the time our nation was born there were strong non-economic as well as economic ties with the center of the industrial revolution that was beginning in Europe and in England, particularly. These ties had a vital influence on the ideas and attitudes of early Americans. Notwithstanding these close ties, the colonies obtained early political freedom which freed American development from the restraints on industrialization imposed by other nations on many colonies. This delicate balance of influence without domination and control materially altered the attitude toward change and permitted an early development of industry.

As our nation developed, there were amazingly few social restraints on industry imposed by either politics or religion; both placed a premium on hard work, savings and economic progress. Coupled with this "work and saving" complex was our unique land tenure system. Although we had an abundance of land, the system of huge land grants to private persons to develop and operate under a feudal or landlord system was practiced in very few cases in the United States. The dominant pattern of land development was fee-simple title to relatively small blocks of land for individual farm families. The early American attitude toward land found its most significant expression in the Homestead Act. Although the small tracts distributed under this Act were later to prove to be inadequate, this early land policy accomplished a most significant feat: it established a land tenure pattern wherein

the rewards of superior management generally are directly associated with the effort, skill, and willingness to take risks.

Another important facet of our early setting was our emergence into world commerce. Even though our independence was won by war, and our emerging nation had to nurture its industries from infancy, there soon developed a relative absence of restraints between this country and the leading industrial areas. Thus, there was a close exchange of ideas, a ready market for our emerging commercial agriculture and a flow of capital into America.

I'm not sure just how to evaluate this next and final point concerning our early attitudes and setting. The founding fathers were idealists, and men of great vision who formed lofty concepts. Sometimes these concepts have had to be compromised just a bit in practice. For example, the Declaration of Independence, with its statement that all men are created equal, established equality in the real world as a goal, but it has been acknowledged most in terms of "equality of opportunity." The political process soon become the tool by which attempts were made to establish equality of opportunity. This procedure is still going on and is a part of our dynamic process.

Agriculture's Contribution to Growth

Even in early colonial times, a commercial agriculture arose as the center of economic activity of most communities and colonies in America.

Our agriculture was established by people who had to learn to grow new crops and old crops in new environments. The process of resolving these problems tended to keep our early farmers restlessly on the move seeking new ways of doing things, new crops, new lands, new and better machines, and new markets—seeking always to be a part of the community of trade.

In some countries, it is still possible to describe the economic activity and business community and hardly mention the farm unit because farming presently is more a traditional way of life

than an economic activity. This has never been the case in America. Here, agriculture is, and has always been, a vital industry in our business community, and the family farm has been, and is, the primary business unit of agriculture.

An important argument in my paper is that this early development of commercial agriculture gave birth to our industrial development; that it supplied the critical resources and skills for industry; and created the initial purchasing power and demand for industrial products. In countries where commercial agriculture has not developed, capital accumulation is very low, labor productivity is low, the demand for industrial products is very limited, and industrialization has lagged.

Let us look at these contributions in more detail, and to do so we must consider them one by one, although, in fact, they are always used together in various combinations.

Human resources. Without question the most essential and creative primary factor of production on which the capacity and growth of a nation depends is its human resource: the size, rate of growth, age composition, health, education and skills, and the motivation of its people.

Very early in the 19th century, as our nation was beginning, approximately 90 percent of our working population was in agriculture. By 1860 this figure had been reduced to 60 percent, although in absolute terms the number of workers in agriculture continued to increase until 1910, reaching a peak of 11.6 million. The number had dropped to 9.5 million by 1940 and in 1960 was reported at 5.7 million, a decrease of 40 percent in the last 20 years.

A rapidly expanding agriculture in the early years of our nation was possible only with a rapidly expanding farm population. From the time colonization began until about three-quarters of the way through the 19th century, more new people moved into American agriculture, either from overseas or from urban areas in this country, than moved out. Even in this early period, how-

ever, commercial agriculture was serving as a training ground for entrepreneurial enterprise, supplying our budding industrial revolution with leadership trained in commercial enterprise and economic rationality. The attitudes and talents which these people took with them were vital to the early growth of industry.

In its early stages of development American agriculture tended to be land intensive, that is, it substituted land for labor and capital wherever possible. As a consequence, many people, both historians and conservationists, have accused these pioneers of exploiting and plundering our land resources to the aggrandizement of their generation and the peril of the future. Given the scarcity of labor and capital and the abundance of land, it seems to me in the main these early settlers and farmers made the appropriate choices. The result was an increasingly productive agriculture that, with an ever decreasing proportion of the Nation's workers, supplied a rapidly expanding population. The workers thus released were quickly attracted into a growing industry.

Some 6 million people moved out of agriculture during the 1920's when agriculture was experiencing a post-war recession and the remainder of the economy was in apparent prosperity. The movement slowed down to slightly more than 3.5 million during the 1930's owing to the loss of economic opportunity off the farm. With the recovery from the great depression, and World War II, migration from the farm increased to 9 million during the forties, a reduction of 31 percent in rural-farm population due to migration. During the 1950's another 9 million persons moved to urban areas.

Even within each decade, however, the rate of off-farm migration has been highly sensitive to changes in the rate of unemployment in the economy. Whenever this latter figure exceeded $4\frac{1}{2}$ to 5 percent, outmigration from agriculture slowed down materially.

The dominant force moving people off the farm and into industry is the attraction of greater economic opportunity. One should not conclude that only marginal people move out. Many of proven management ability have been attracted by better opportunities in industry and commerce. In addition, a large number of well trained and, in some cases, highly educated farm youth have moved into industry or professional service in urban areas. More than one-half of the farm population age 10-19 in 1940 had left the farm by 1950, compared to 40 percent for those age 20-24. Less than 20 percent of those 30-49 years old in 1940 had moved from the farm by 1950. Clearly, those moving out of agriculture were in the prime of their working years. Without this vast movement of labor out of agriculture, both unskilled and trained, industry could not have expanded as it did. Most of the capital required to educate and train this labor supply originated within agriculture and constitutes a notable contribution of agriculture to the economic growth of our nation.

Improving the human resources. Just a little over a century ago a frontier politician by the name of Abraham Lincoln campaigned for the Presidency on a platform of agrarian reform, among other things. Because the Southern States seceded on his taking office, the control of government passed, suddenly, from plantation agriculture to business. And whereas during the first 75 years the political dominance of agriculture left no clear-felt need for a special department in Washington, suddenly the need was felt keenly. Lincoln quickly signed three bills designed to help agriculture. 1) The bill creating the U. S. Department of Agriculture, 2) The Morrill, or Land-Grant College Act, and 3) The Homestead Act.

It was the latter that received the greatest attention at the time, but it was the first two that were to have the greatest long-term impact on agriculture. Not even Lincoln could imagine how far-reaching they would be. The law establishing the Department of Agriculture described its primary function "to acquire

and to diffuse among the people of the United States useful information on subjects connected with agriculture in the most general and comprehensive sense of the word.”

The Hatch Act in 1887 provided grants to States for experiment stations and encouraged research designed to make farmers more efficient. In 1914 the Smith-Lever Act established the Federal-State Extension Service, thus completing the three-cornered program of teaching, research, and extension by the land-grant colleges.

The establishment of the USDA and the land-grant college system was an attempt to improve the opportunities for rural people. Prior to that time, only the relatively wealthy normally attended universities. The new program meant that the opportunity for a college education would be available to just about everyone who wanted it and who was otherwise determined to get it. Furthermore, it elevated the study of agriculture and the mechanical arts to the university level.

Although in actual dollars it doesn't bulk very large, relative to the cost of other factors, the most significant inputs that were made in American agriculture, I believe, are those spent in the establishment of the U. S. Department of Agriculture and the land-grant college system, and their subsequent programs of research and education. In few, if any, other ventures has the marginal productivity of capital been so great.

The products have been of several types. First, the new discoveries—new, improved varieties; hybrid seeds; balanced fertilizers; new machines; chemicals for disease, weed and insect control; and growth hormones—have combined to supply our nation with the brestest abundance and variety of wholesome food that any nation has ever experienced. Second, the educational programs have equipped many of our outstanding farm youth with professional skills with which they have made outstanding contributions to society, both rural and urban. And third, it is my belief that the farm youth programs of 4-H and FFA, combined

with a vigorous exposure to commercial enterprise on the farm, have done much to equip our farm youth for service both in and out of agriculture.

The combined programs in research and education of USDA and the land-grant colleges have opened up new opportunities for capital.

Agriculture as a User of Capital

The Balance Sheet of Agriculture lists the total physical assets of agriculture at a current value of over \$206 billion. This is impressive, and if it all represented capital that had been saved out of production and allocated to agriculture at the expense of investment elsewhere one could conclude, justifiably, that our agricultural growth had occurred at the expense of industrial growth. Obviously this is not what the figures represent. In constant prices (using 1910-14 as a base) nearly three-fourths of the value of agriculture's physical assets has been in land over the years. In an aggregate sense, the opportunity cost of this land to our economy is near zero. That is, most farm land is not a resource that can be used for other purposes than agriculture. Surprisingly, this percentage figure changed very little between 1860 and 1940, although there has been a tendency for it to decline in the last 20 years.

In order to meet the needs of a rapidly expanding domestic population plus a growing foreign demand, American agriculture underwent early rapid expansion. Some new machinery, buildings, and equipment were needed, of course, but this early expansion of output depended heavily on new land development, and less on resources that were needed for expanding industrial development.

This is a highly significant factor, since even as late as 1860 agriculture comprised almost half of our gross national product. If, in those early years, agriculture had competed more directly and more heavily with industry for scarce labor and capital, it

could have contributed much less to our industrial development than it did.

The period of heavy investment in agriculture of resources with a high opportunity cost began with the adaptation of the internal combustion engine about 1914. Computed in constant prices, the heaviest expansion in farm machinery and equipment occurred between 1915 and 1920, and then again, beginning in 1940, after our nation had achieved the status of the leading capitalist nation. The value of machinery and equipment on our farms (in constant dollars) has increased nearly 140 percent since 1940.

At the peak of animal draft power in the 1920's there were some 15 million horsepower equivalents on our farms. Today we have an estimated 15 million tractors, trucks, cars, and combines on about half as many farms as we had in 1920. A recent estimate listed the mechanical power equipment on our farms at 115.6 million horsepower, all railroads at 88.7, and all factories at 28.2 million.

Thus, although agriculture today is a heavy user of capital, the historical pattern of use is one which allowed for a maximum of industrial growth during the period of early and rapid expansion of our economy.

Agriculture as a Producer of Capital

The abundance of land distributed to large numbers of people on a fee simple basis helped establish a favorable attitude toward labor-saving innovations, and the marginal productivity of capital invested in such improvements was very high. This, in turn, provided an incentive for a high rate of saving and capital formation. In fact, the power of agriculture to save has been nothing short of phenomenal. (Among some farmers at times, the propensity for saving has been almost pathological, at the sacrifice of the health, education, and welfare of the farm family.)

In addition to the savings which successful commercial farmers accumulated, parts of which were invested in building industries, our commercial agriculture earned valuable foreign exchange. Our close link with the emerging industrial areas of Europe provided a ready market for a number of farm products, including wheat, tobacco, hides, wool, and cotton. These were exchanged for capital goods of many kinds which were vitally needed for industrial development here at home.

Furthermore, a commercial and expanding agriculture became the sound base of our economy, that attracted vast quantities of foreign capital into this country. Not to be overlooked, also, is the fact that agriculture supplied the bulk of reserves required to operate the Government including its investment and development activities as well as its operation in those earlier years.

Aside from the dollars and foreign exchange which agriculture produced for its own expansion and the early development of industry, it contributed materially to the productivity of our labor force as farm youths moved from agriculture into industry. Important, also, is the contribution of an adequate diet. In countries where people are inadequately fed, labor is relatively unproductive. Without question, agriculture made one of its greatest contributions to the growth of the American economy by keeping our people well fed and strong.

Agriculture as a Market for Industrial Products

At the same time that agriculture was supplying capital and labor to a budding industry, it also comprised an important market for industrial products which could not yet compete on a world market. In turn, an efficient industrial economy has made possible the dynamic agriculture of the last generation, when there occurred a veritable technological revolution in agriculture which is still going on.

Practically all the power used on today's farms, as well as the fuel, fertilizer, and building materials; all the chemicals for weed,

disease, and pest control; and much of the feeds and most of the foods are supplied from off the farm. It has been estimated that industry now supplies farmers with commercial inputs at an annual rate of about \$18 billion. As a consequence of these inputs, combined with a continuous upgrading of the human resources in agriculture, output per man-hour has increased by about 240 percent since the mid-thirties.

Agriculture's Dependence on Industry

Clearly, both industry and agriculture have come to depend heavily on one another. Whenever agriculture experiences an economic setback industry experiences a slackening in the demand for many of its products. Similarly, when there is a slack in total employment in industry the demand for many farm products falls.

Agriculture today has little choice but to be a vital part of the business and industrial community. Reflect for a moment what would happen to our farms if, for example, our oil refining and distributing system were suddenly immobilized. Practically all of agriculture would soon come to a standstill.

One sees some startling paradoxes when comparing our agriculture with that of our arch-rival in this global conflict—Russia. On the one hand, our farms are highly capitalized, mechanized, and productive; one person in agriculture can produce enough food and fiber to sustain about 26 persons, and still food surpluses burden farm prices. At the same time our national policy is one of subsidizing farm income and farm exports and thus attracting more capital into agriculture. On the other hand, a Russian farmer, with little capital and few machines or tools, produces enough for only himself and four others. Even so, Soviet rulers squeeze capital out of agriculture in order to invest it in publicly-owned industry. Nevertheless, it is true that a war which destroyed the factories and refineries of the world would be more devastating to our agriculture than to theirs. We would not be

able to get the draft animals to empower our machines, and our supply of hoes and mattocks would be woefully inadequate.

Economic Growth and Agricultural Adjustment

The process of economic growth has required substantial changes in both the quality and combinations of productive resources. Capital in a multitude of forms has been substituted for labor in farm production, leaving a reservoir of unused or only partly used labor in rural areas.

Agriculture now demands higher training and performance from its managers and most of its labor than was needed formerly. Farm mechanization and chemistry has altered the economic potential of different lands. Favored by this change are large tracts of lands that can be leveled or that lend themselves to mechanization or irrigation. Seriously penalized are small plots of hilly land. Natural fertility, which 100 years ago was the primary quality consideration of land, is of considerably less relative importance today.

More than in any other field, new technological developments in agriculture are the result of research and educational activities by State and Federal Government agencies. The funds have been appropriated primarily for the stated purpose of improving the economic condition of farmers.

The early adopters of new farm production techniques reaped benefits, of course, because the new techniques lowered unit cost of production. Similarly, some of the benefits were distributed, at times, to the more progressive distributors who adapt quickly to new developments. However, as other farmers and distributors followed the leaders in adopting the new practices, the cost curve to the industry shifted downward and the supply curve for farm products shifted to the right. As a consequence, farm prices declined to where the increased output often sold for less than the original, smaller, supply.

Under these circumstances farm incomes have, at times, been lowered by the programs designed to raise them. However, society has vastly benefited by having a more abundant and cheaper food supply. In no other nation do industrial workers have to labor so few hours to supply the food needs of their families. So that while the benefits of agricultural progress are quite generally distributed among our society of consumers in the form of lower prices for food and fiber, the burden of this progress has fallen largely on agriculture.

Some Problems to Be Resolved

If we are to achieve the fullest benefits of agricultural progress for farmers and the economy as a whole both for now and for the future, there are a number of unresolved questions the answers to which we must pursue. Three of these, I believe, are especially germane to the present topic.

First. Conservation of natural resources. We are becoming keenly aware that many of our natural resources are not unlimited in terms of the prospective long-term ideological conflicts that confront our nation. It is important that we learn how to use these scarce resources so that the future use-rates are not impaired. This does not mean that we refrain from using them now in favor of some remotely anticipated period. Rather, we need to learn how to use them so that their continued use will be made possible.

Second. We must speed the adjustments in human resources in those less advantaged areas that largely have been by-passed by economic progress. Many of these people are carrying the burden of the needed adjustment arising out of the economic growth which agriculture has experienced during the last generation.

The solution to this problem is important not only to ourselves in terms of lost economic activity and human suffering here and now. It has longer-run connotations. If investment in research

and education lead to more rapid changes which continue to leave people stranded in agriculture, one answer is to reduce this investment and cease to aggravate the problem. The long-run consequences of this decision make such action untenable in present world circumstances.

Clearly, the solution lies in getting these people gainfully employed outside of agriculture. Unfortunately, this is a difficult solution. Many of them have limited skills outside agriculture and have not enough productive years left to undertake the expense of developing new skills and moving to new locations. Under the burden of family responsibility, many hesitate to uproot themselves and move to a large and strange city under conditions of high job uncertainty. Nevertheless, many others have been making such moves to an extent that in some cities serious and difficult problems of assimilation have arisen.

If we are to achieve the full benefit of continued agricultural progress we must face the serious problem of social acculturation and economic reorientation of those human resources that have become surplus in agriculture. The first necessary condition for making the adjustment is that the chance for job opportunity be high. The record is clear on this point. In periods of high unemployment, outmigration from agriculture slows down. In addition, an overt program in education, job training, and social acculturation is needed. The problem cannot be solved without it.

Third. The last problem I want to mention is not unrelated to the second, but it is a broader problem. And I admit that I might be on shaky ground so far as short-run economic efficiency is concerned. But I feel I am on solid philosophic and moral ground.

The more I commute between and within our large metropolitan centers the more dissatisfied I become with what we are bringing forth. It is my deep conviction that this kind of social organization fails to establish the environment in which man can

achieve his worthiest ambitions in life. We have not yet begun to face the problems that such sprawling metropolitan areas and the resulting social structures are creating.

In my opinion, we need to devote a great deal more attention to ways and means of achieving a more meaningful geographic dispersion of industry.

Distributing non-farm opportunities more evenly throughout agricultural areas will go far in solving the surplus labor problem in agriculture. In addition, it will help reduce some of the serious problems I feel we will someday face if our huge metropolitan areas continue to expand as they have done in the last 20 years.

Growth in a dynamic economy cannot be as balanced and uniform as in a living organism. We must expect that some phases will get out of kilter at times. And when important segments lag behind as much as have selected parts of agriculture, help is needed. However, in providing this help we must not circumscribe agriculture so that farmers cannot continue to make adjustments of their own. In providing this help we should try always to avoid types of action which will tend merely to postpone, prolong, transfer, or perhaps even intensify the eventual adjustments which are in keeping with continued agricultural progress.

Let me close on this positive point: We can all be proud of our great agricultural industry, and the part that you in the USDA, in the land-grant universities, and in related industries have played in making it so productive and so dynamic. Agriculture can be proud of its great contribution to the growth and welfare of our people. As a nation we are greatly blessed to have the most dynamic, best managed, and most productive agriculture in the world. And it seems to me we all have much at stake in seeing that we keep it that way.

AGRICULTURE, TODAY AND TOMORROW

Orville L. Freeman

I deeply appreciate this opportunity to participate in the Centennial Lecture Series, dedicated to the theme of "Growth Through Agricultural Progress." The topic assigned to me—Agriculture, Today and Tomorrow—logically appears as the last of this series of lectures. The other topics, emphasizing the contribution of agriculture to our nation, the story of the land-grant colleges, and a century of performance by the U. S. Department of Agriculture, all appropriately fit into the foundation of a discussion of the future of American agriculture.

My schedule prevented me from being here for the earlier lectures in the series. This schedule was necessitated by plans to learn at first hand some of the answers to the question of how agriculture can make its most effective contribution in the years immediately ahead. On October 8, I left Washington for a study of problems relating to agriculture, primarily in those Asian nations where American understanding and assistance are needed most. I took with me qualified technicians from the USDA. This study is vitally important to the topic under discussion today because worldwide needs and world conditions have a more profound effect on this Nation's agriculture than they ever have before, and hopefully this Nation's agriculture can also help to meet needs throughout the world. I shall return to this subject a little later in this discussion.

Orville L. Freeman became Secretary of Agriculture in 1961. He served as Governor of Minnesota from 1955 to 1960. His major goals for agriculture are to provide for basic human needs, to obtain an adequate reward for farmers, and to insure natural resources for the future.

In presenting my ideas on Agriculture, Today and Tomorrow, I shall try to refrain from encroaching upon the subject matter of the distinguished and able speakers who have preceded me in this lecture series. Jesse W. Tapp, of the Bank of America, has shown how the tremendous productive success of American agriculture has contributed to the economic growth and progress of the entire Nation. James H. Hilton, president of the Iowa State University, has told how indispensable has been the contribution of the land-grant colleges to that success. Vernon Carstensen of the University of Wisconsin, and Henry A. Wallace, one of my most distinguished predecessors, have presented profiles of the history of the USDA that can only challenge us to build most effectively on the illustrious tradition of this Department.

I shall refer to these contributions and achievements only as they form parts of the frame of reference within which I believe we must look at agriculture today as we determine to work toward our goals for tomorrow.

Permit me to state these goals—as I see them—as clearly and simply as possible.

I shall attempt to assess how far we have progressed toward the attainment of these goals and to evaluate the factors that have contributed to this achievement. I shall suggest some of the problems and difficulties that confront agriculture more critically today than ever before, and I shall even venture to suggest some of the approaches that I believe are necessary to solve these problems and to meet these difficulties.

The Scientific Revolution

Any consideration of these problems must be presented in terms of the scientific and technological revolution that dominates the age in which we live. The magnitude of the potential effect of this revolution upon our lives and our future is so great that the impact of previous great historical developments, such as the industrial revolution, fades into relative insignificance.

Even as we live in the midst of these revolutionary changes, few of us recognize their tremendous import. And because we fail to realize their magnitude and their significance we do not face up to the dangers inherent in our failures to adjust to those changes. Nor do we accept the challenge of potential gains far beyond man's fondest dreams in an era that is now past.

There are two aspects of this scientific and technological revolution that must be noted. In the first place, science and technology have now progressed so far that for the first time in history we can clearly foresee the physical possibility of producing enough so that no one in the world need be in want for the material goods he needs. In the United States, as in some other countries, this potential has become a reality insofar as agricultural products are concerned. In varying degrees it is becoming a reality with regard to many other commodities as well. We are being thrust from an economy of scarcity into an economy of abundance faster than we have been able to adapt our thinking and our institutions to this revolutionary change. Most of our problems are affected by this delay in adjusting our social and economic thinking.

A second aspect of this revolution that has tremendous import for us today is the extent to which it links the future of every individual on earth to what happens in the rest of the world. As the scientific revolution has expanded our productivity it has shrunk the size of the planet on which we live. There is no such thing as a purely domestic question in a world in which nuclear weapons are stockpiled and men can orbit the earth in a matter of hours. And the problems of American agriculture must therefore be considered in terms of the world.

Goals for Agriculture—Providing Basic Human Needs

One fundamental goal of all agricultural effort throughout history has been the production of primary goods to meet basic human needs. In the earliest agricultural society each member

produced for himself and his family. As societies advanced and specialization increased, as human need became more complicated and began to include more and more manufactured products and services, the producers of food and fiber produced more than enough of these primary products to satisfy their needs. Their increasing productivity then provided for the diversification of commodities available to us, and provided a base for industrial growth.

In approaching this goal—that of providing food and fiber to to meet human needs and on which to base economic growth—American agriculture is a tremendous success, far beyond what has been generally recognized. One American farmer now produces enough for 25 others, more than twice what he could produce only 20 years ago. It is appropriate to recognize those elements that have contributed to this great success story.

✓ I believe that one of the principal elements in this success is the application of the skill and ability of the American farmer in an agricultural economy based upon free enterprise and personal incentive on an owner-operated family farm. I believe that this system of agriculture has, by its very success, proved its overall superiority, in both human and economic terms, over other forms of land tenure and agricultural organization. I believe that this system is of such great value that its preservation should be an imperative in our farm programs and policies. It is therefore fitting that in our centennial observance in agriculture we recognize the importance of the Homestead Act as it contributed to this truly American family farm economy.

Another basic element in the productive success of American agriculture also can be traced to the policies launched a century ago to further research and education through our land-grant colleges and the United States Department of Agriculture. These colleges and this Department, our experiment stations and Extension Service, as well as the departments of agriculture in the several States, have provided media through which scientific and

technological progress could make a maximum impact on agriculture because it is made available to millions of individual farmers throughout the Nation, not only in schools and colleges, but in their own communities and on their own farms.

Yes, we have gone a long way toward the goal of producing abundantly enough to meet the needs of the people of America for the products of our farms. We have not been as successful in distributing these products to all who need them, but in this respect, too, we are making progress. Less than a generation ago one-third of our people were ill-fed and ill-clothed. Today, by similar standards, that fraction has been cut to 5 or 10 percent.

We are intensifying our efforts to use our abundant agricultural productivity to meet basic human needs in the larger community that encompasses the world. I shall speak further of this effort as one of the principal challenges to American agriculture.

In one other respect do we need to take further action toward the goal of meeting human needs. We need to adapt the ever-normal granary concept to a scientifically determined reserve supply adequate to meet any emergency.

Goals for Agriculture—Adequate Reward to Farmers

The tremendous productive success of agriculture in the United States is a major factor in our high level of living and in our industrial development. But its economic rewards today accrue chiefly to the general public, principally to the consumer who gets more and better food, at less real cost, than anywhere else in the world at any other time in history, and how little this fact is realized in this country today. This leads to my second goal for agriculture.

A concern for the human resources involved in our farm economy is an integral part of the American ideal of equality of opportunity and concern for human welfare. Abundant productivity is not enough, unless those who produce that abundance receive a fair reward for the capital, labor, and managerial effort

that they invest. In this respect in the United States today we fall so far short of our goal that the average per capita farm income is less than half that of the non-farm population.

The paradox in this situation is that to a large extent our very success in reaching the goal of abundant productivity contributes to our failure to reach the goal of adequate farm income.

For many years now we have recognized that a comparatively small surplus of food, in excess of the commercial market demand, results in farm prices too low to maintain a fair level of farm income. We have sought to remedy this by various policies and programs based more on the concept of meeting a temporary or emergency situation than on a clearly understood or well defined policy. We have not yet developed an overall national policy or program directed toward adequate income for farmers and based upon a clear recognition of the implications of an economy of abundance. This, too, is a major challenge that American agriculture and the American public must face.

Goals for Agriculture—Resources for the Future

Another goal of utmost importance in the world of today is concern for resources in both the immediate and the distant future. Half a century ago we awoke to the need for forest protection, but we are just beginning to realize the dimensions of the problem we face with regard to adequate soil and water resources for coming generations. Rapid movement into the cities and suburbs, combined with a high rate of population growth, impose on us the obligation of considering, not only whether we will have enough productive land for farming, but also how we can best utilize our land and water resources to provide future needs for recreation, to maintain and enhance the values of rural life, and to offer to the increasing millions living in the metropolitan areas opportunities to know and appreciate nature itself.

I have so far referred to three broad goals for American agriculture of today and tomorrow, and I have suggested that maxi-

mum progress toward reaching these goals can be attained only if we take into account the tremendous changes inherent in the scientific and technological revolution of today, with its implications of an economy of abundance and of an interdependent world.

In this context, American agriculture faces two great challenges.

The first challenge is whether we can utilize our abundant farm productivity in such a manner as will insure farmers the opportunity to earn a fair reward, without exploiting either the taxpayer or the consumer, and at the same time maintain the values of our American owner-operated family farm and conserve our natural and human resources.

I suggest that we *must* answer this question in the affirmative. And I further suggest that we *can* answer it in the affirmative if we seek the answers by mobilizing those same resources of research, education, extension, and public understanding that have contributed so much to the outstanding productive success of our agriculture during the past century.

Let me be specific. Research and education have taught the American farmer how to produce abundantly. They have not yet shown us how to manage that abundance in the best interests of all.

Science has shown us that we can produce more abundantly than we can consume (in both commercial channels and by special programs to provide food where it is needed) but social science has not yet shown us how to engineer this efficient productivity to benefit and even to protect the producer.

Technological advance has decreed that a constantly dwindling number of farmers, on fewer acres, but with greater investment of such inputs as machinery and fertilizer, can continue to increase their total production; but we have not yet determined how to make the best use of those excess acres, nor have we developed programs for maximum benefit of the human beings whose labor is no longer needed by this efficient agriculture.

We can and we must find the answers to these questions—and without delay. We can do it by devoting to these problems the same kind of talent, ability, study and research that we have given to problems of increased production.

I submit that this presents a major challenge to our land-grant colleges, to our experiment stations, to our Extension Service, and to the Department of Agriculture. It presents a challenge that some would prefer to avoid because it does involve controversial matters, because it does relate to the formulation of public policy, because it does deal with matters that cannot be proved or disproved by chemical analysis or controlled experiments.

But I submit that we cannot avoid this challenge. We cannot avoid it, because it deals with the welfare of human beings, with the future of our resources and our children, with principles and ideals relating to human dignity, and with values we regard as vitally important.

We cannot allow machines to displace men, either in agriculture or industry, without providing those men with the opportunity to find and qualify for other employment.

We cannot allow most of our ablest young farmers to be forced out of agriculture—the one industry that is absolutely essential to human survival—because farming offers economic incentives so much lower than other occupations.

And I believe that we cannot allow modern economic trends, such as the increased need for capital and credit in farming, to jeopardize the continued existence of our owner-operated efficient family farm system—a system that not only has developed the world's most productive agriculture, but also represents the best social and cultural values of rural life.

If we are to accept this challenge we must do more than come up with answers formulated by experts. Research for increased productivity in agriculture was not enough—the knowledge and techniques developed by the experts and the engineers had to be brought to the farmer himself. Social engineering can be assisted

by experts, but it cannot be adopted by them. Therefore one of the biggest tasks ahead will be one of education, of public discussion, of arriving at sound decisions on policy in a democratic manner through participation by the farmers, and by the non-farm public as well.

In this connection it might be well to comment that the "constituency" of those agencies that have done such an admirable job in educating farmers will need to be expanded to include all citizens. Farm policy is no longer made by farmers. Consumers need to understand that much of the progress in what we call agricultural research benefits them much more than it benefits the farmer. The public needs a far better understanding of farm problems and their relationship to the economy as a whole. It needs to become aware of the fact that mechanization on the farm and automation in the factory are twin aspects of the technological revolution that can bring about dislocation and personal hardship—or the blessings of abundance—depending on how they are handled. Farm economics cannot be separated from overall economic problems.

Decision-making in a democracy on matters as important and as involved as these is never simple or easy. But it is the American way. I am confident that the same agencies of study and research and education that have contributed so much to agricultural progress during the past century can meet this challenge. They must meet it if they are to continue to hold their rightful place in American life.

In accepting this challenge I recommend the following words from a speech by one of our nation's earliest agricultural leaders, and one of our greatest statesmen. The following passage by Thomas Jefferson is inscribed on his memorial here in Washington:

"I am not an advocate for frequent changes in laws and constitutions. But laws and institutions must go hand in hand with the progress of the human mind. As that becomes more devel-

oped, more enlightened, as new discoveries are made, new truths discovered and manners and opinions change, with the change of circumstances, institutions must advance also to keep pace with the times. We might as well require a man to wear still the coat which fitted him when a boy as civilized society to remain ever under the regimen of their barbarous ancestors."

The second great challenge facing American agriculture today, and it is surely part and parcel of the first, is how it can make its maximum contribution to support freedom and progress and to advance the cause of peace and security in the world.

In a sense this challenge is forced upon us by the abundance of our productivity. In a sense it is imposed upon us by our own belief in freedom, and by our awareness that our own security and our own future may well depend on the choice made between communism and democracy in the uncommitted nations of the world.

✓ There are at least three ways in which we can meet this challenge. One way lies in the use of our superiority over the Communists in agricultural productivity as a propaganda weapon in those nations and among those peoples that are seeking rapid economic growth and are greatly in need of increased agricultural production. This is one of the assets of our free society that we haven't even begun to use as effectively as we could.

Most of the developing countries of the world are primarily agricultural in their economies, and most of them are desperately in need of greater efficiency in farm production, both to provide their people with more adequate nutrition and to release labor for accelerated economic growth. Many of them have just recently acquired their independence, and in their emergence from a colonial status have not yet settled such questions as land tenure and ownership.

✓ What could be more persuasive in bringing about a demand for a system of private ownership of farms, for an owner-operated family farm system similar to ours,—What could be more appeal-

ing to people who have yearned to own their own land and are now free to choose policies that will make such ownership possible,—than a clear understanding that the most abundantly productive agricultural economy in the world is based on that kind of ownership? What could be more effective today than the simple but dramatic facts of agricultural production,—of hunger and even famine under communist agriculture, as compared with our production here, under a system where production is stimulated by individual ownership and personal incentive, in such abundance that we have plenty to spare and to share? ✓

A second way by which we can meet this challenge is by sharing, not only our system of land ownership and operation, but our experience in providing the kind of supervised credit that helps to make that kind of ownership effective, and our technological and scientific know-how in production methods. By expanded and more effective programs of technical assistance, to improve agricultural productivity in the emerging nations, we can help them to raise their level of living rapidly enough to give them real hope for the higher standards they must have for stability and democracy.

The third way to approach this challenge is to expand and intensify our efforts to use our abundance—our “surplus” if you will—to help feed the hungry who are in need because of disaster or emergency, or because their own economies are not yet advanced enough to provide the food they need; to use the products of our excess productive capacity as part of the investment in economic growth in the emerging nations of the world.

I believe that the farmers of this nation, and all the people of this nation, overwhelmingly support such programs. I believe we support them because of our own self-interest as well as because of our moral standards. I believe that, just as no community in America would countenance stored food while neighboring children were hungry, so the American people who recognize the larger community of nations cannot accept the concept of any

real surplus of food while people anywhere are suffering from hunger.

We have made a month's tour for the purpose of learning how we might best meet this responsibility. We sought ways of advancing international trade. We tried to evaluate existing programs of foreign aid involving the use of American food to meet needs and in support of economic development. We explored opportunities for developing new and improved methods to make our Food for Peace program more effective.

At the conclusion of the trip I spoke at the biennial conference of the Food and Agriculture Organization in Rome, with the hope that the member nations will cooperate in planning effective multilateral programs to increase agricultural production in food-deficit nations, and in the use of food to combat hunger and promote economic growth.

American agriculture is in a position of world leadership. As a result of that position it has an obligation to lead effectively in the direction of the maximum utilization of the scientific and technological revolution of today to bring about the economy of abundance that is possible in the world of tomorrow.

If we would meet the challenge of this new age of space, of power, and of potential plenty we must be ready to follow Jefferson's advice and adapt our social and economic institutions to direct the power that man has created and direct it in the best interest of mankind. The future—not only of agriculture, but of our entire civilization—may depend on how well we succeed.

Let us resolve to meet this challenge.

Let it never be said that, in these critical years of the scientific revolution, we were able to send men into space but unable to put bread and milk into the hands of hungry children.

Let it never be said that we had the scientific knowledge and technical skill to produce power sufficient to destroy civilization, but that we did not have the ability, the vision, and the will to use that knowledge to produce and distribute the abundance that science and technology now offer to a world at peace.

